

ABSTRACT OF THE DISCLOSURE

A regenerative fuel cell system, comprising an electrolyzer portion and a fuel cell portion; the electrolyzer portion has a closeable hydrogen inlet and a hydrogen outlet in communication with the cathode of the electrolyzer portion for conducting hydrogen, a gas bypass having a gas bypass inlet and a gas bypass outlet for conducting oxidant gas for fuel cell reaction to the fuel cell portion, a water inlet and an oxygen-water outlet for exhausting oxygen generated in electrolyzer operation and coolant water from the fuel cell portion out of the electrolyzer portion; the fuel cell portion has a hydrogen inlet, a first closeable hydrogen outlet for exhausting excess hydrogen in fuel cell mode, a second closeable hydrogen outlet for exhausting hydrogen generated in the electrolyzer portion in electrolyzer mode, an oxidant gas inlet, an oxidant gas outlet, a coolant water inlet and a coolant water outlet; and the hydrogen inlet of the fuel cell portion being in communication with the hydrogen outlet of the electrolyzer portion; the oxidant gas inlet of the fuel cell portion being in communication with the gas bypass outlet of the electrolyzer portion; and the water inlet of the electrolyzer portion being in communication with the coolant water outlet of the fuel cell portion.